

WHAT IS CLAIMED IS:

1. An optical information recording medium comprising a substrate, and a plurality of optical information recording layer units formed on said substrate with interposition of transparent intermediate layer, each of said optical information recording layer units including an optical recording layer for recording an optical signal, and a dielectric multilayer reflecting layer laminated on said optical recording layer directly or through another film, wherein each of said dielectric multilayer reflecting layers has a dielectric multilayer film formed as a repetitive laminate of low refractive index thin films and high refractive index thin films; and a variable refractive index thin film formed in said dielectric multilayer film and exhibiting nonlinear change of its complex refractive index induced by light irradiation.
2. An optical information recording medium according to Claim 1, wherein reflectance of a portion of an optical information recording layer unit used for reading/writing information by condensed laser beam irradiation is higher than that of the other portion of said optical information recording layer unit.
3. An optical information recording medium according to Claim 1, wherein the number of said units is 2 to 10.
4. An optical information recording medium according to Claim 1, wherein the total number of said

low refractive index thin films, said high refractive index thin films and said variable refractive index thin film in each of said units is 9 to 20.

5. An optical information recording medium according to Claim 2, wherein said dielectric multilayer reflecting layer formed in each of said information recording layer units is provided so that a reflectance difference $\Delta R (= R_2 - R_1)$ between reflectance R_2 of a portion used for reading/writing information by condensed laser beam irradiation and reflectance R_1 of the other portion is not smaller than 0.8.

6. An optical information recording medium according to Claim 1, wherein each of said dielectric multilayer reflecting layers is formed so that the ratio n_1/n_2 of the refractive index n_1 of each low refractive index thin film to the refractive index n_2 of each high refractive index thin film is not higher than 0.80, and that the product nd of refractive index n and film thickness d of each refractive index thin film is in a range of from 0.15 times to 0.35 times as large as the wavelength of the laser beam used for reading/writing information.

7. An optical information recording medium according to Claim 1, wherein: said variable refractive index thin film in each of said dielectric multilayer reflecting layers is a thin film containing particles of at least one element selected from the group

consisting of Co, Fe, Ni, V, Mn, Cr, Cd, Zn, Cu, Ag, Pt and Au, or particles of oxide, nitride or sulfide of said selected element; said low refractive index thin films are thin films made of SiO_2 ; and said high refractive index thin films are thin films made of at least one member selected from the group consisting of TiO_2 , ZnS-SiO_2 , Si_3N_4 and Ta_2O_5 .

8. An optical information recording medium according to Claim 1, wherein said intermediate layer is made of an amorphous dielectric thin film having a film thickness of from 0.3 μm to 3 μm , both inclusively.

9. A method of manufacturing an optical information recording medium, comprising the steps of: forming a dielectric multilayer reflecting layer on a substrate by a chemical vapor deposition method; forming a variable refractive index thin film by a sputtering method; forming protective layers and an optical recording layer; and forming a number of recording layers by repeating the aforementioned steps, wherein a multilayer structure is formed by said chemical vapor deposition method carried out in such a manner that a source gas put in a vacuum chamber is replaced by a new one alternately.

10. A method of manufacturing an optical information recording medium according to Claim 9, wherein said substrate rotates on its own axis and revolves around a certain axis when film formation is

performed by said chemical vapor deposition method or said sputter method.

11. An optical information recording device comprising an optical information recording medium, a pickup for reading/writing optical information from/in said optical information recording medium, and a spindle motor for giving rotation drive to said optical information recording medium while supporting said optical information recording medium, said optical information recording medium including a substrate, and a plurality of optical information recording layer units formed on said substrate with interposition of transparent intermediate layer, each of said optical information recording layer units having an optical recording layer for recording an optical signal, and a dielectric multilayer reflecting layer laminated on said optical recording layer directly or through another film, each of said dielectric multilayer reflecting layers having a dielectric multilayer film formed as a repetitive laminate of low refractive index thin films and high refractive index thin films, and a variable refractive index thin film formed in said dielectric multilayer film and exhibiting nonlinear change of its complex refractive index induced by light irradiation, wherein said pickup includes an auto focusing mechanism, and a laser beam irradiation angle keeping mechanism which is used together with said auto focusing mechanism so that an optical axis of a laser

beam emitted from said pickup can be automatically kept substantially perpendicular to said optical information recording medium when said optical information recording medium tilts.

12. An optical information recording device according to Claim 11, wherein said laser beam irradiation angle keeping mechanism receives an input signal for indicating an intensity distribution of said laser beam and controls the angle of said pickup in accordance with said input signal to thereby keep the laser beam irradiation angle constant.

13. An optical information recording device according to Claim 11, wherein said optical information recording medium is formed so that reflectance of a portion of an optical information recording layer unit used for reading/writing information by condensed laser beam irradiation is higher than that of the other portion of said optical information recording layer unit.

14. An optical information recording device according to Claim 11, wherein the number of said units in said optical information recording medium is 2 to 10.

15. An optical information recording device according to Claim 11, wherein the total number of said low refractive index thin films, said high refractive index thin films and said variable refractive index thin film in each of said units in said optical

information recording medium is 9 to 20.

16. An optical information recording device according to Claim 11, wherein said dielectric multilayer reflecting layer formed in each of said information recording layer units in said optical information recording medium is provided so that a reflectance difference $\Delta R (= R_2 - R_1)$ between reflectance R_2 of a portion used for reading/writing information by condensed laser beam irradiation and reflectance R_1 of the other portion is not smaller than 0.8.

17. An optical information recording device according to Claim 11, wherein each of said dielectric multilayer reflecting layers in said optical information recording medium is formed so that the ratio n_1/n_2 of the refractive index n_1 of each low refractive index thin film to the refractive index n_2 of each high refractive index thin film is not higher than 0.80, and that the product nd of refractive index n and film thickness d of each refractive index thin film is in a range of from 0.15 times to 0.35 times as large as the wavelength of the laser beam used for reading/writing information.

18. An optical information recording device according to Claim 11, wherein: said variable refractive index thin film in each of said dielectric multilayer reflecting layers in said optical information recording medium is a thin film containing

particles of at least one element selected from the group consisting of Co, Fe, Ni, V, Mn, Cr, Cd, Zn, Cu, Ag, Pt and Au, or particles of oxide, nitride or sulfide of said selected element; said low refractive index thin films are thin films made of SiO_2 ; and said high refractive index thin films are thin films made of at least one member selected from the group consisting of TiO_2 , ZnS-SiO_2 , Si_3N_4 and Ta_2O_5 .

19. An optical information recording device according to Claim 11, wherein said intermediate layer in said optical information recording medium is made of an amorphous dielectric thin film having a film thickness of $0.3\ \mu\text{m}$ to $3\ \mu\text{m}$.

20. An optical information recording medium according to Claim 1, wherein said dielectric multilayer reflecting layer formed in each of said information recording layer units is provided so that a reflectance difference $\Delta R (= R_2 - R_1)$ between reflectance R_2 of a portion used for reading/writing information by condensed laser beam irradiation and reflectance R_1 of the other portion is not smaller than 0.8.